Existing Conditions Study of the Arroyo Burro, Mission, Sycamore, and Laguna Creek Watersheds

City of Santa Barbara

Creeks Advisory Committee Workshop

August 11, 2005

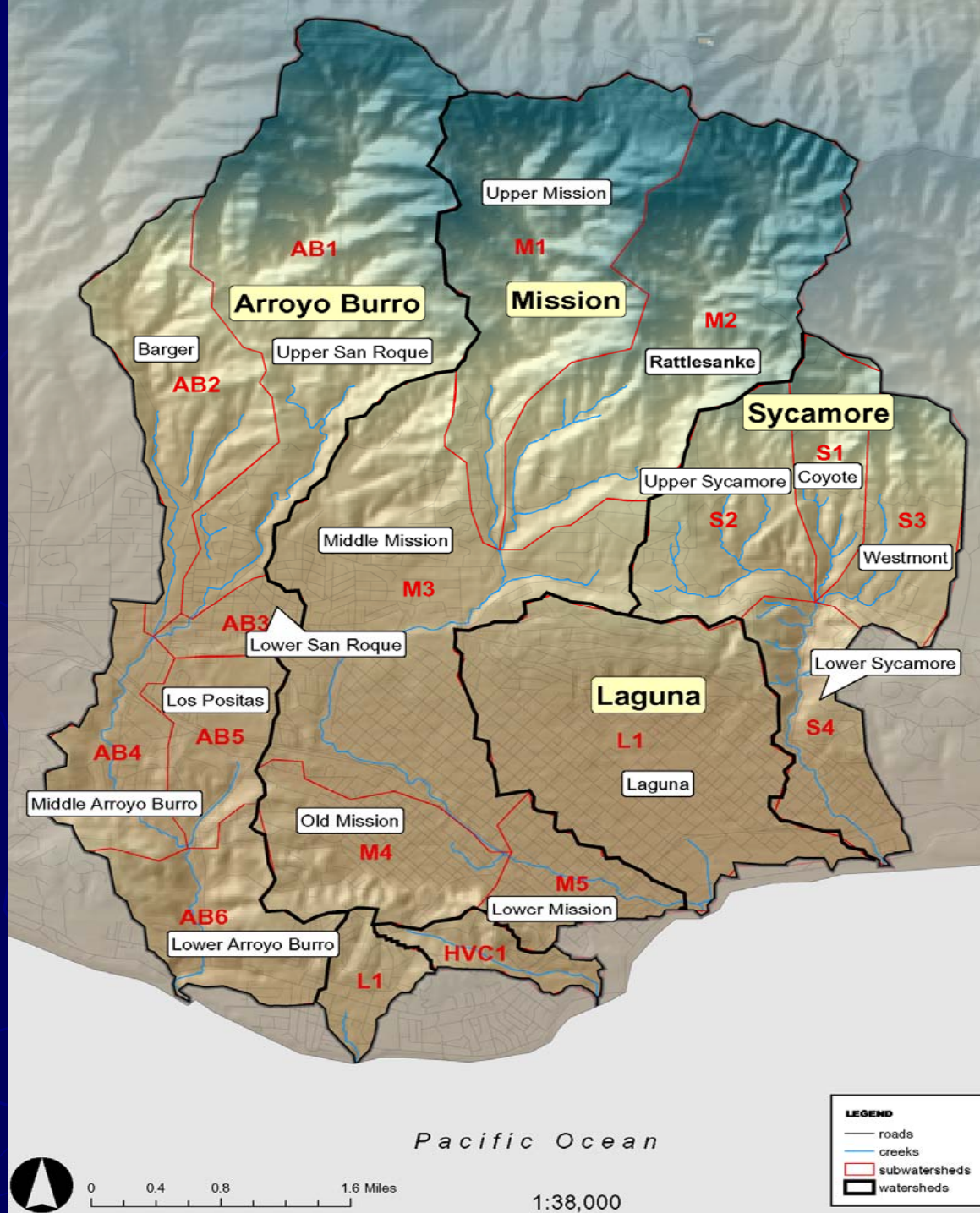
Introduction

Study Purpose

- Watershed-view of existing conditions
- Survey of existing conditions as well as identifying what data is missing
- Provides the basis for Watershed Action Plans
- A ***Watershed Action Plan*** covers all water-related issues and resources, including flooding, bank stability, groundwater, creek restoration, fisheries, habitat enhancement, and water quality. The Plan looks at contributing factors and cause-and-effect relationships on a watershed-wide scale, identifies needed Programs and best agencies to implement them.

Study Watersheds

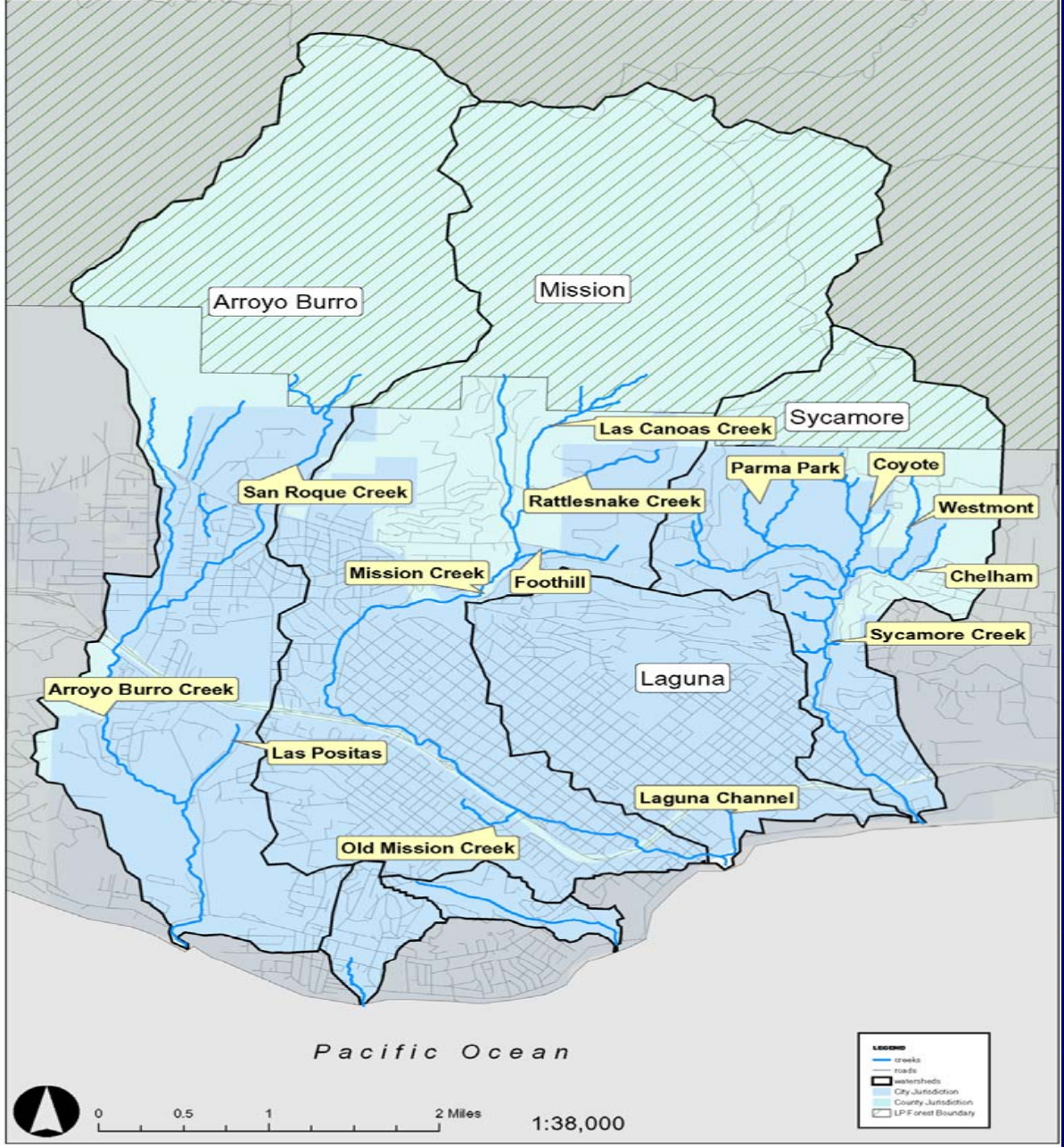
- Arroyo Burro
- Mission
- Laguna
- Sycamore



Regulatory Framework

Creek and Watershed Programs are Administered by Many Jurisdictions, and Regulations Overlap

- City Departments
- County Departments
- Los Padres National Forest, Santa Barbara District
- Local Districts
- Educational and Watershed groups also contribute to education and implementation



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PROJECT NUMBER: 240073
DRAWN BY: JRK
APPROVED:

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Political Jurisdiction

Existing Conditions Study of the Arroyo Burro, Mission, Sycamore, & Laguna Watersheds

FIGURE

1-2

State & Federal Authorities

- Biological Resource Regulations
- Flooding, Water Resource, Water Supply & Water Quality Regulations
- Groundwater Regulations
- Wastewater & Solid Waste Regulations
- Geology & Soils Regulations
- Cultural Resource Regulations

Related Projects & Existing Studies

- Master Environmental Assessment (MEA)
- City of Santa Barbara Creek Inventory and Assessment Study
- Draft HGM Guidebook for South Coast Santa Barbara Streams
- City of Santa Barbara Water Quality Monitoring Program
- County of Santa Barbara Groundwater Monitoring
- County of Santa Barbara Creeks Bioassessment Program
- Steelhead Assessment
- Septic System Sanitary Survey (2003)
- South Coast Watershed Characterization Study
- Lower Mission Creek Flood Control EIR/EIS
- Coastal Changes Program (NOAA- C-CAP)
- UCSB LTER Project
- USDA Forest Service Management Plan

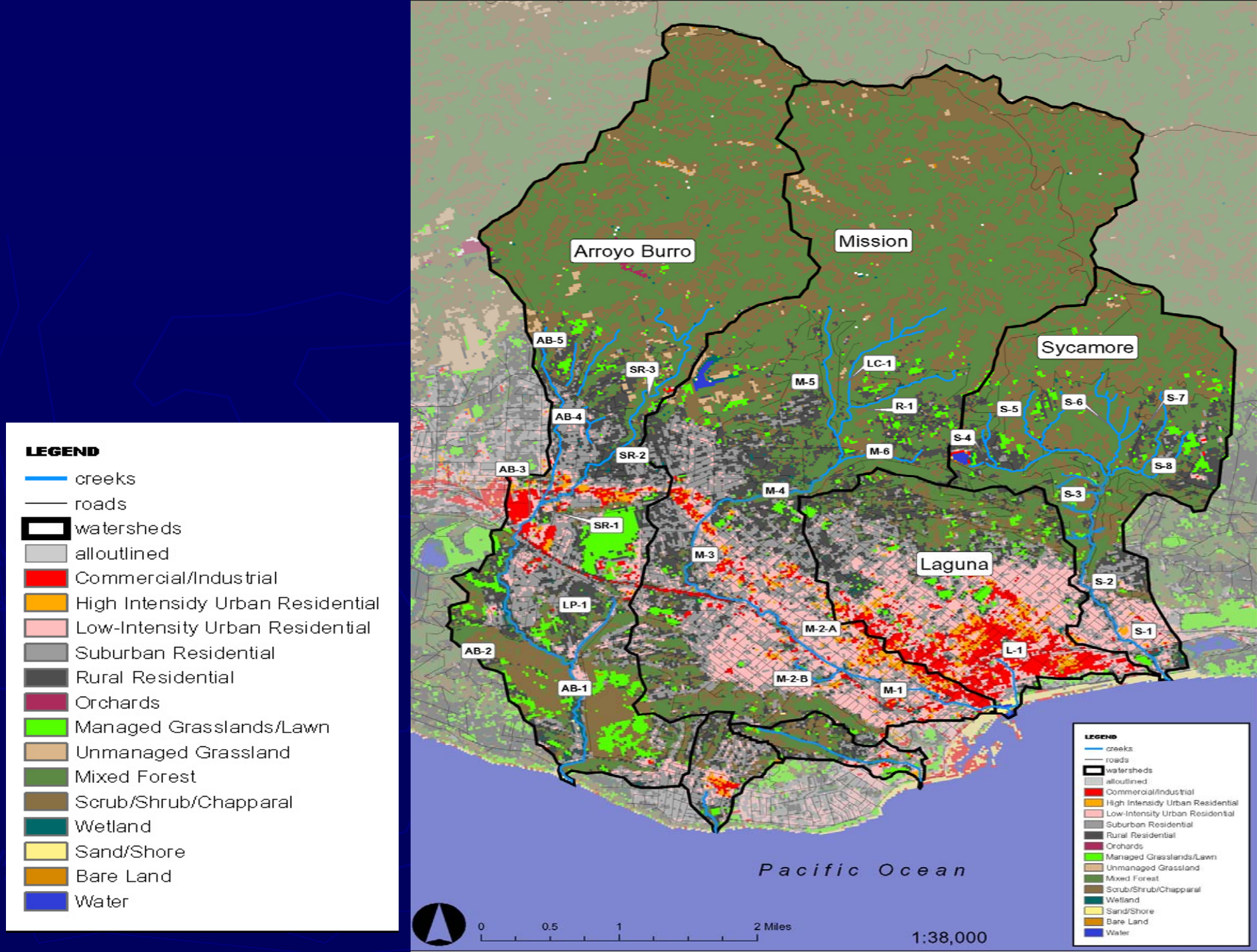
Key Findings

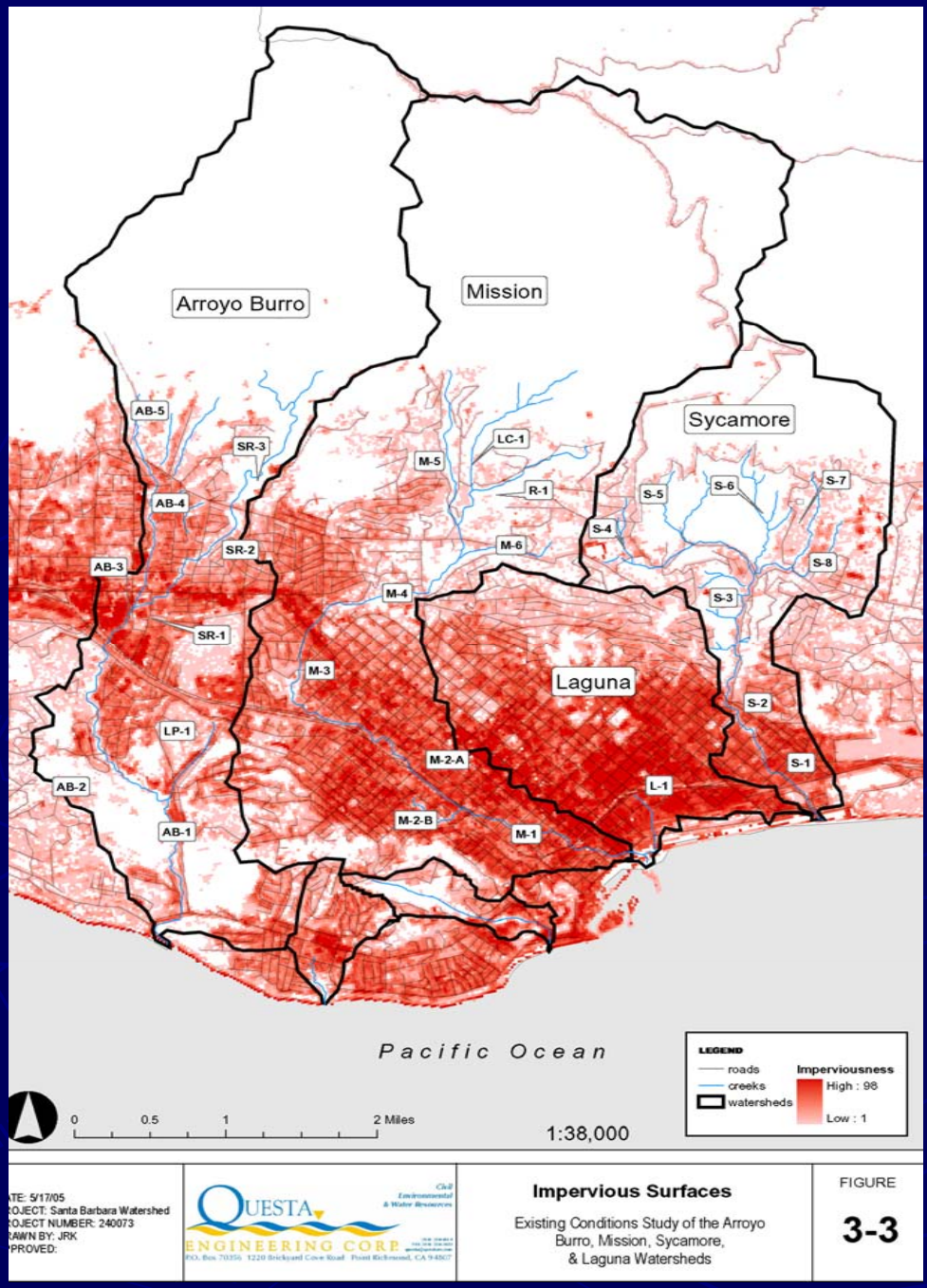
- Overlapping jurisdictions and regulatory framework can delay review of small projects.
- Multiple management and regulatory responsibilities exist within city and county government
- Streamlined permitting and design guidelines and criteria are needed

Land Use, Cultural Resources & Infrastructure

Land Use/Land Cover

- Land Ownership and Jurisdiction-
  - Half is City, 1/3 is Forest Service, rest is County
- Land Use Patterns-
  - Lower areas are urbanized; upper reaches are not
- Impervious Surface Area ranges from 9% in Arroyo Burro to 39% in Laguna Creek, double if only urban areas considered.
- Other Planning jurisdictions include:
  - Santa Barbara County General Plan
  - Mission Canyon Specific Plan Area
  - Forest Service Lands


LEGEND
creeks
roads
watersheds
alloutlined
Commercial/Industrial
High Intensidy Urban Residential
Low-Intensity Urban Residential
Suburban Residential
Rural Residential
Orchards
Managed Grasslands/Lawn
Unmanaged Grassland
Mixed Forest
Scrub/Shrub/Chapparal
Wetland
Sand/Shore
Bare Land
Water
Arroyo Burro
Mission
Sycamore
Laguna
AB-5
AB-4
AB-3
AB-2
AB-1
SR-3
SR-2
SR-1
LC-1
M-5
R-1
M-6
M-4
M-3
M-2-A
M-2-B
M-1
LP-1
S-5
S-6
S-7
S-4
S-8
S-3
S-2
S-1
L-1
Pacific Ocean
0
0.5
1
2 Miles
1:38,000



The lower and middle reaches of the watersheds are the most intensively developed.

Land Use Key Findings

- Watershed Action Plans will need to continue to coordinate with General Plan
- Develop land use guidelines that fit the watershed, such as use of porous paving on perm. soils, filtering media in high impervious zones, on-site runoff detention in middle/upper watersheds, per detailed hydrologic analysis

Water Supply Key Findings

- City obtains little surface water from the watersheds
- Water supply does not need to be a central focus of the watershed action plans
- Water importation, recycling, and landscape use is important
- Should be evaluated as part of the watershed action plans, or groundwater management plan

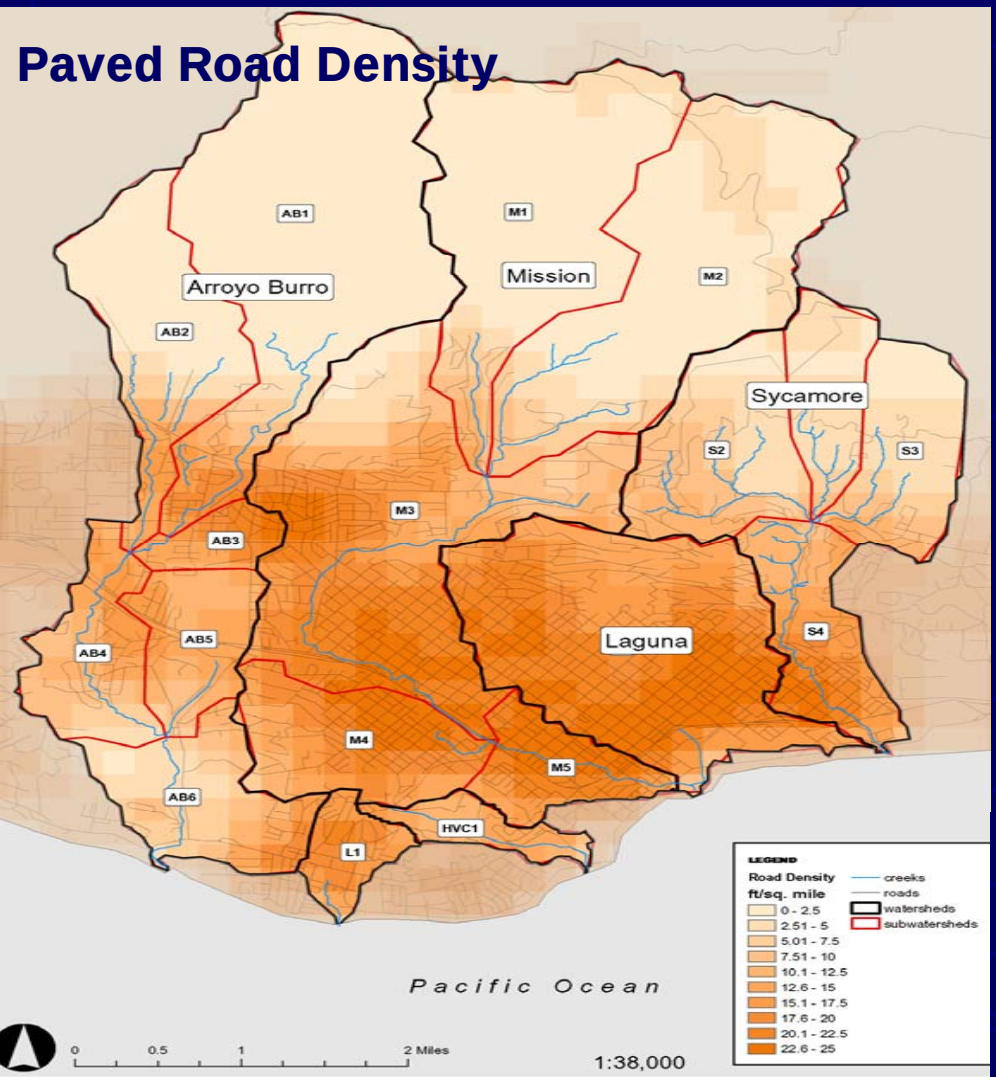
Utilities and Storm Drainage Infrastructure

- City's Storm Water Management Program (SWMP) addresses this
- Important element of Watershed Action Plans

Wastewater and Solid Waste

- Onsite wastewater planning is needed, especially in Lower Arroyo Burro
- Coordinate with proposed Sewer Lateral Inspection Program
- No major groundwater contamination has been identified
- Coordination is needed with LUFT program to monitor groundwater

Transportation and Access Roads



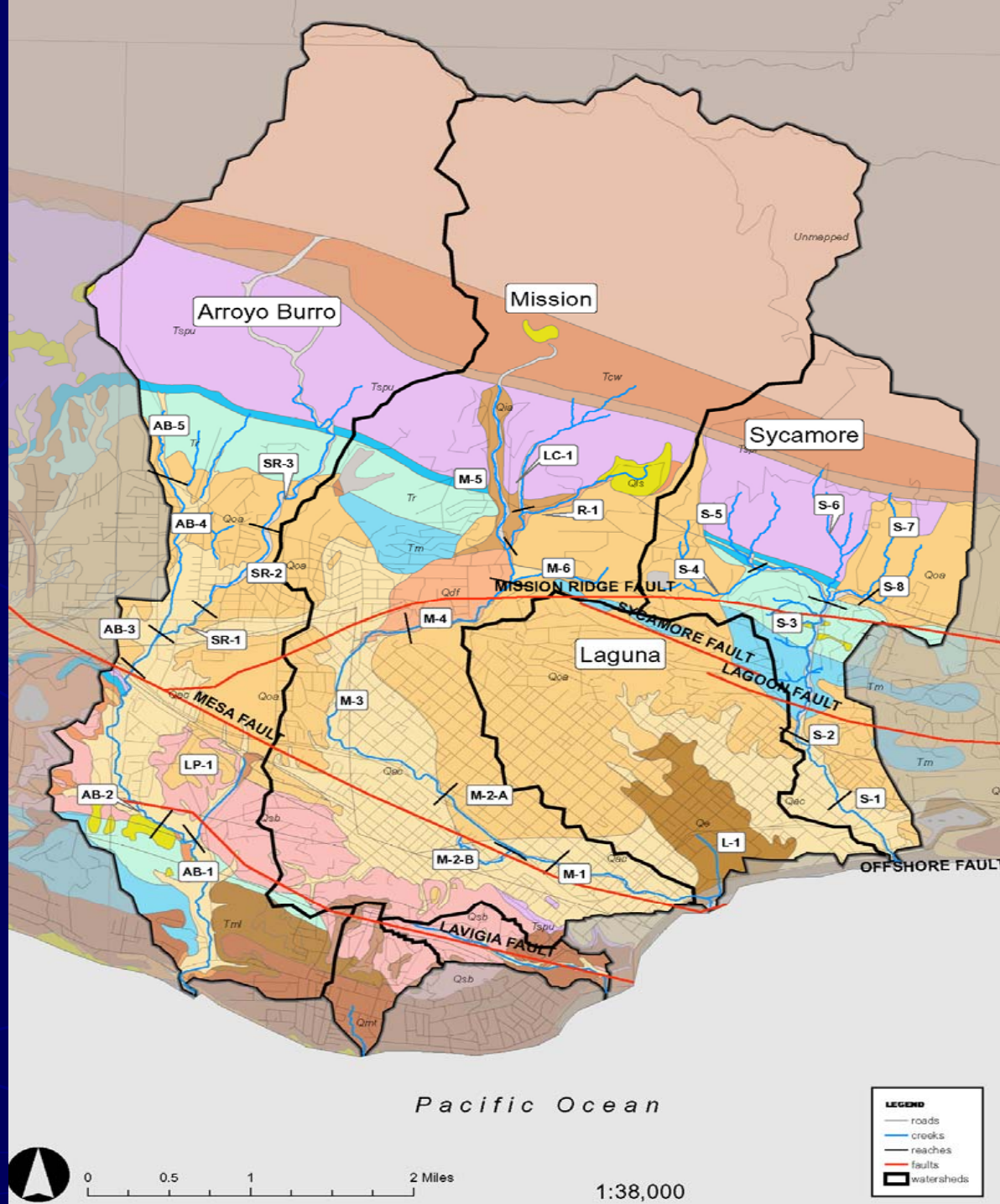
- Storm Water Management Programs address roads, but runoff from large paved areas needs to be addressed
- Most eroding or unpaved roads are in unincorporated areas or in Los Padres N.F.
- Watershed Action Plans should coordinate with County & Forest Service to develop remedial actions to reduce road sediment

Fire Protection and Emergency Services

- City General Plan & Fire Services
- US Forest Service
- Vegetation Management Requirements
- Wildland Fire Management Plan
- Consider post-fire watershed treatments
- Consider conflicts between fuels management and creek restoration

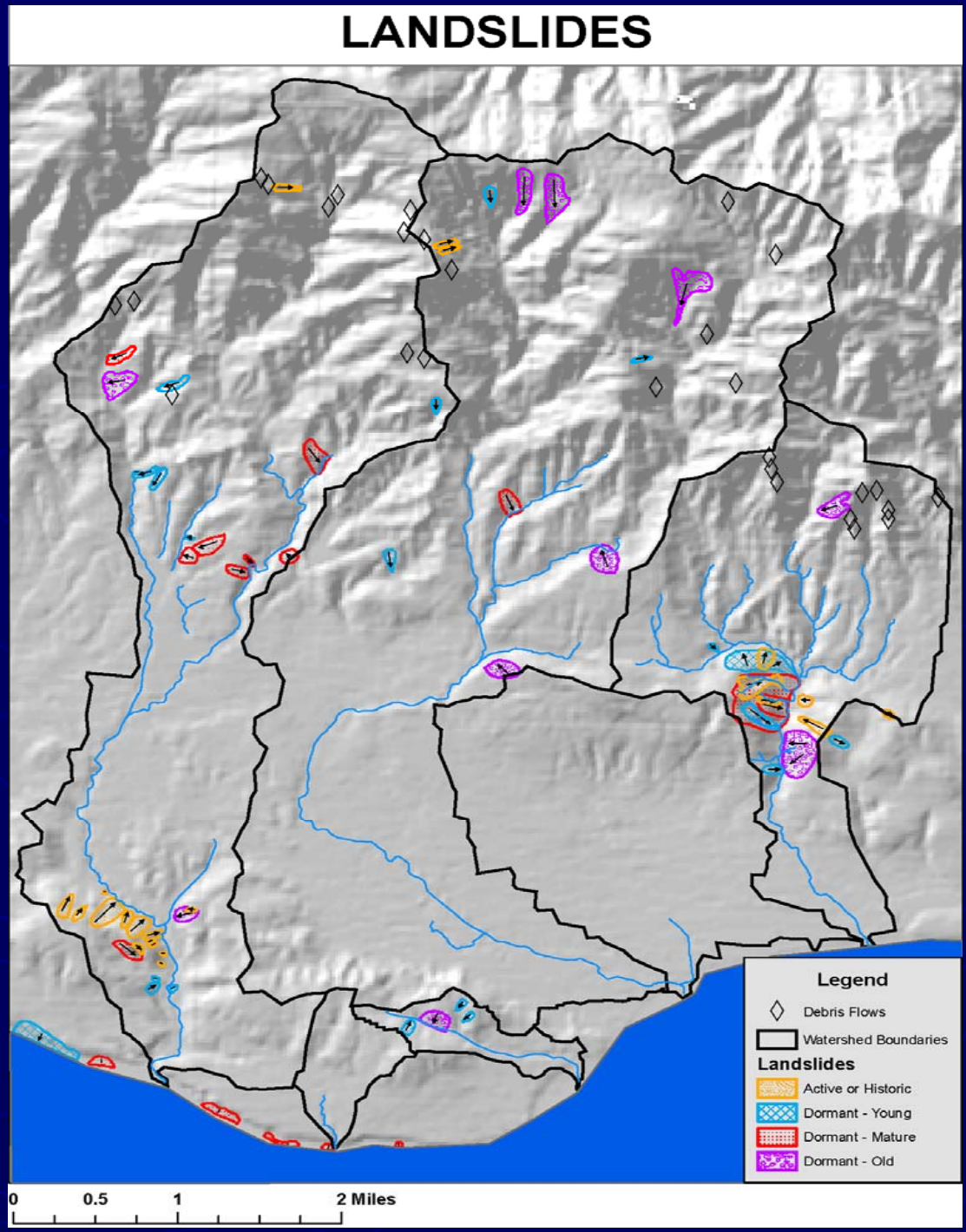
Citywide Watershed Conditions

Geology and Soils



Soils

& Landslides



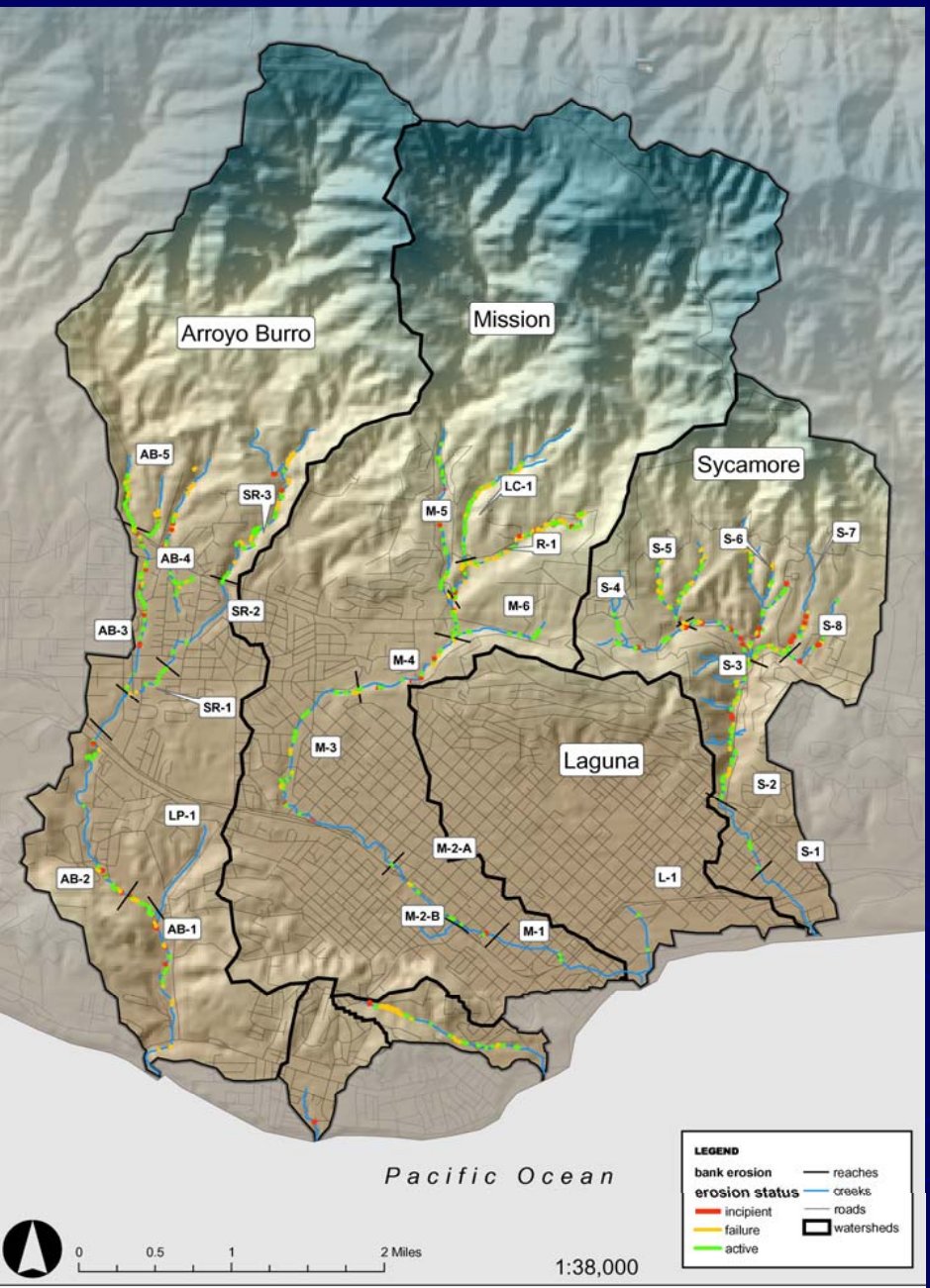
Key Findings-Geology

- Deep-seated geologic creek bank failures along lower Arroyo Burro, Upper Sycamore Creeks
- Geotechnical investigations should be required for projects in sensitive or unstable areas along creeks
- Geotechnical guidelines could be part of watershed action plans.
- Some bank stabilization issues are best addressed on a broader creek reach or neighborhood-wide basis.
- Determine if there is community interest in the formation of Geologic Hazard Abatement Districts (GHAD) for community-wide geologic problems.
- Landslide maps should be updated regularly.

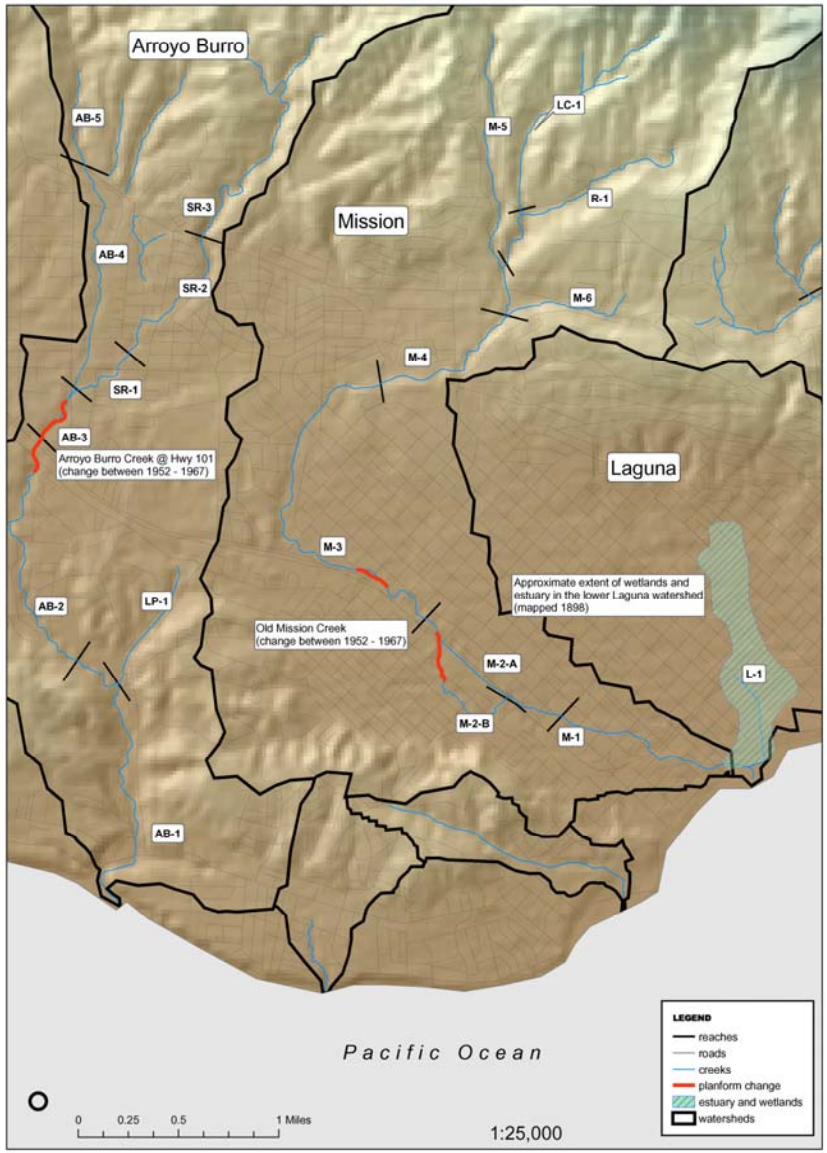
Geomorphology and Channel Stability

- Landforms
- Geomorphology
- Channel modification, bank stabilization and restoration projects need to take a comprehensive view to avoid creating problems elsewhere

Bank Erosion



Bank Modification



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SOURCES: 1898 & 1953 topo map

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Approximate Extent of the Historic Laguna Wetlands and Creek Planform Change

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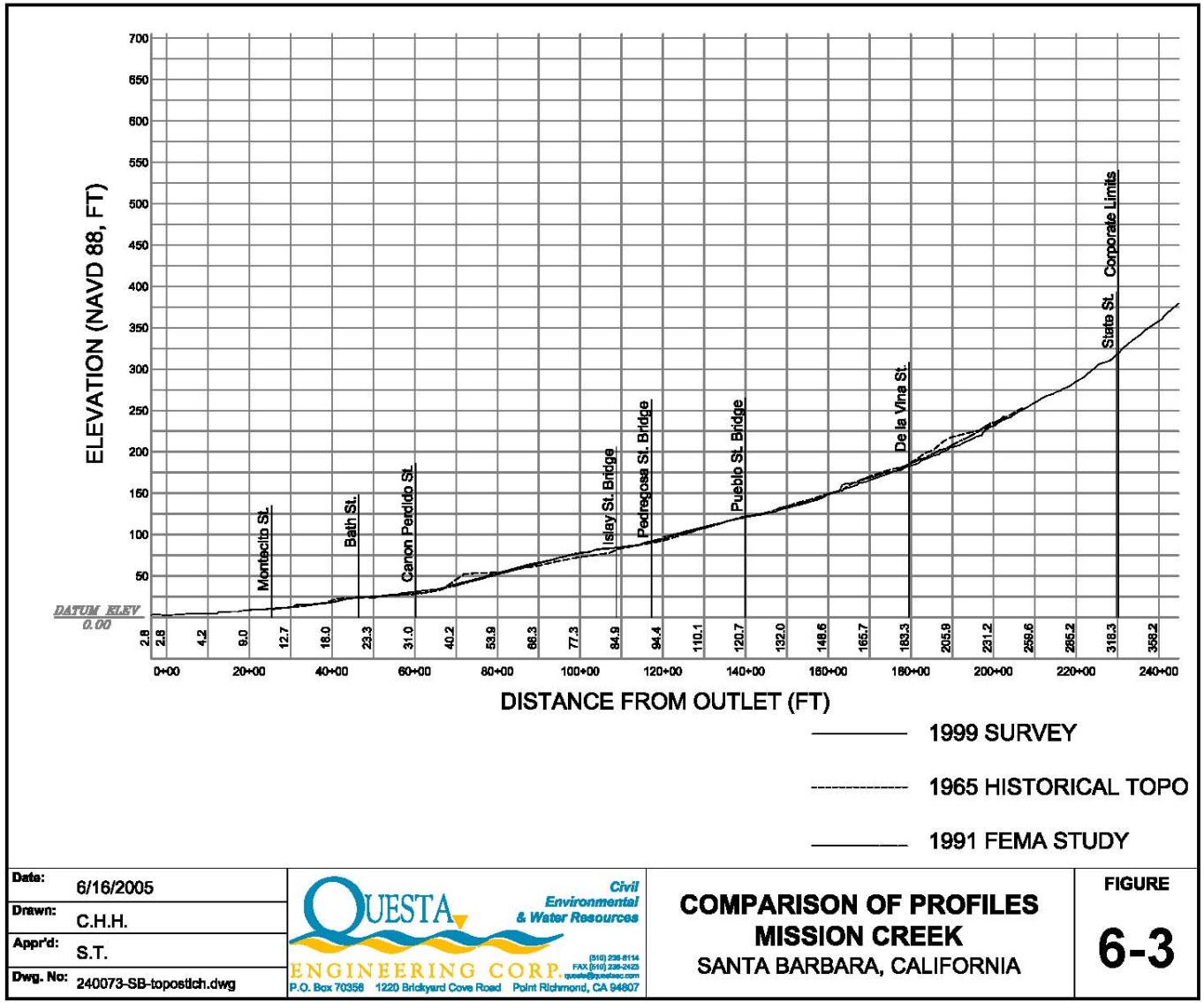
FIGURE



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COMPARISON OF PROFILES
MISSION CREEK
SANTA BARBARA, CALIFORNIA

FIGURE
6-3

Geomorphology

- Many creek reaches unstable, with history of bank failure/repair that are propagating problems
- Bank structures have a design life, many are approaching, problem will get worse
- Bank stabilization is a private responsibility but creek instability is community caused problem
- WAP should consider innovative means of planning/funding on neighborhood or reach basis

Hydrology, Drainage and Flood Control

- Flooding typically occurs:
  - Lower Mission
  - Lower Sycamore Creek
  - Above the Laguna channel
  - Arroyo Burro Creek above Highway 101
  - Mission Creek above State Street
- Because of creek encroachment & shallow flooding, flood control expensive, low Benefit:Cost
- Consider Proactive/Incentives based floodproofing programs

Groundwater

- City is in South County Groundwater Basin, well understood and managed by City & county
- Groundwater in 3 zones, shallow, moderate, deep. Creeks in connection w/ shallow zone- gaining & loosing reaches
- Shallow zone complex, paleochannels, culverted sections
- Groundwater management is needed to balance use and replenishment, preserve quantity/quality of creek inflow
- Additional investigation of quality, depth, gradient, and direction of flow of shallow groundwater zone needed
- Watershed action plans should investigate shallow groundwater management plan, following AB3030 guidelines
- Focus on shallow zone groundwater quality to facilitate water quality grant funding

Water Quality

- Santa Barbara's water quality varies by reach , additional monitoring is needed to identify sources of contamination,
- Key component of Watershed Action Plan

Terrestrial Biology

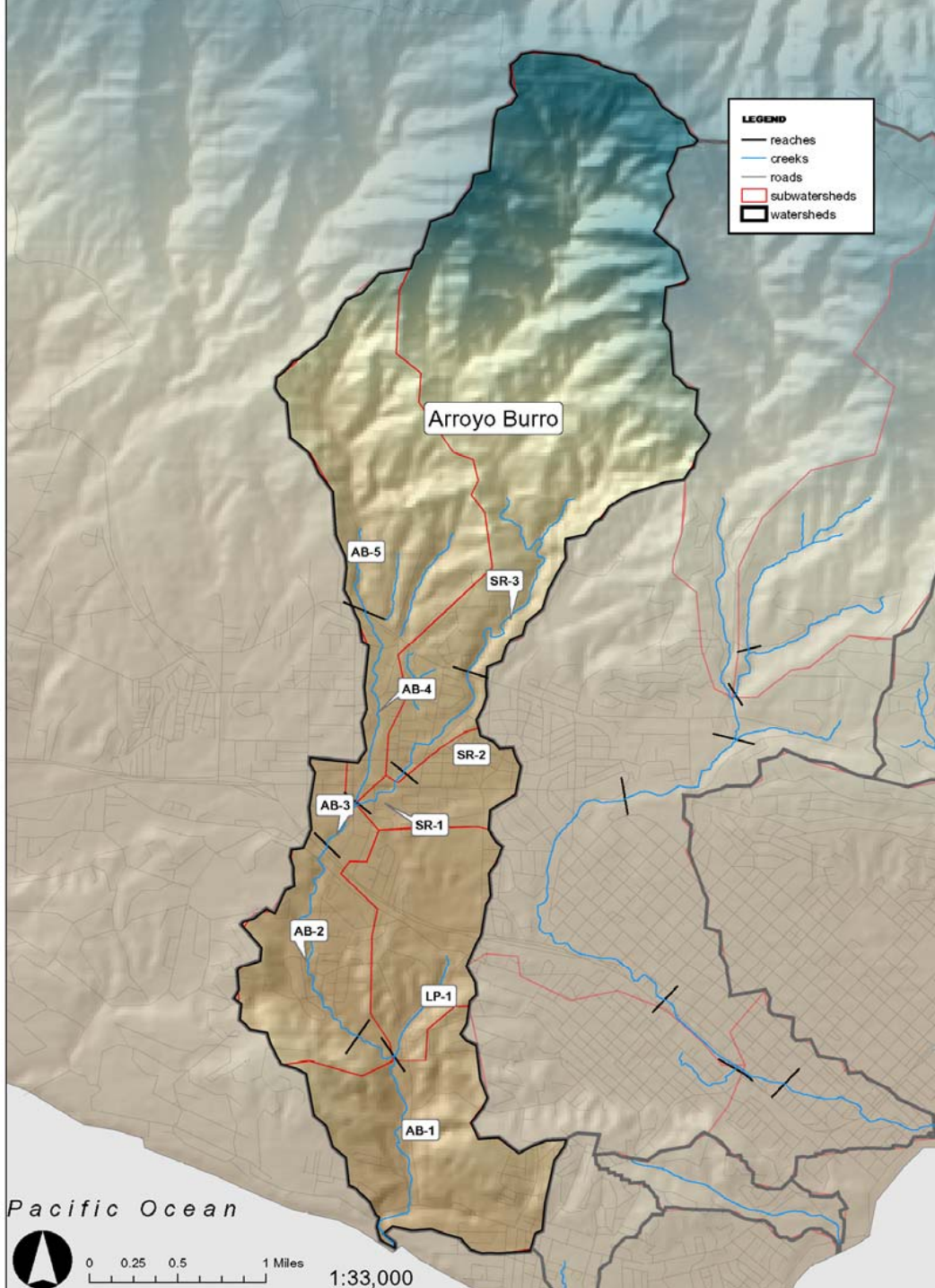
Middle & lower reaches are urbanized and fragmented

- Upper reaches have riparian creek corridors with chaparral uplands
- Key Issues for Watershed Action Plans:
  - Create and protect corridors for wildlife movement
  - Preserve important riparian stands
  - Coordinate protection of Special-Status Species
  - Coordinate Exotic species erradication with SB County Week Management Agency

Fisheries

- Culverts, concrete channels &low-flow crossings have created fish passage barriers to important upstream habitat
- Coordinate with Tri Fish (TCFT) programs for barrier removal
- BMPs for stream and fisheries habitat, permit streamlining, restoration and enhancement projects, and channel management should be part of a coordinated program

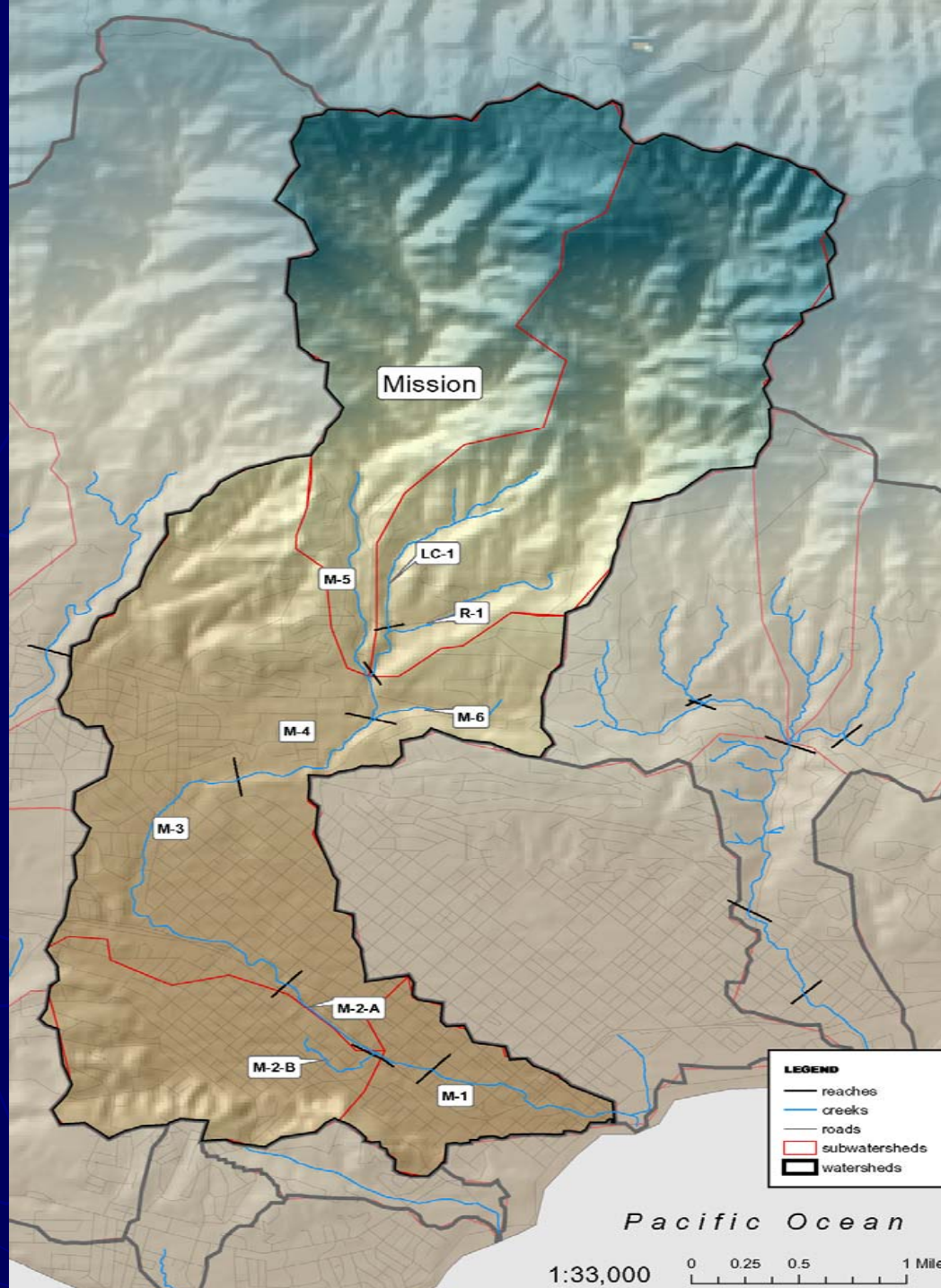
Arroyo Burro Watershed Conditions



Arroyo Burro Key Findings

- Sediment aggradation in upper watershed may be due to lack of conveyance in downstream creek culverts and major culvert crossings
- AB reaches susceptible to bank failure due
  - hydraulic toe scour
  - undercutting of over-steepened banks,
  - deep-seated geotechnical causes,
- Integrated approach is needed
- Fish-friendly grade control structures and flow deflectors can be considered
- High velocities and bank shear stresses may preclude pure biotechnical bank stabilization – case by case analysis
- Isolated hard channel revetments have upstream and downstream impacts on other channel segments
- 18 Fish passage barriers identified

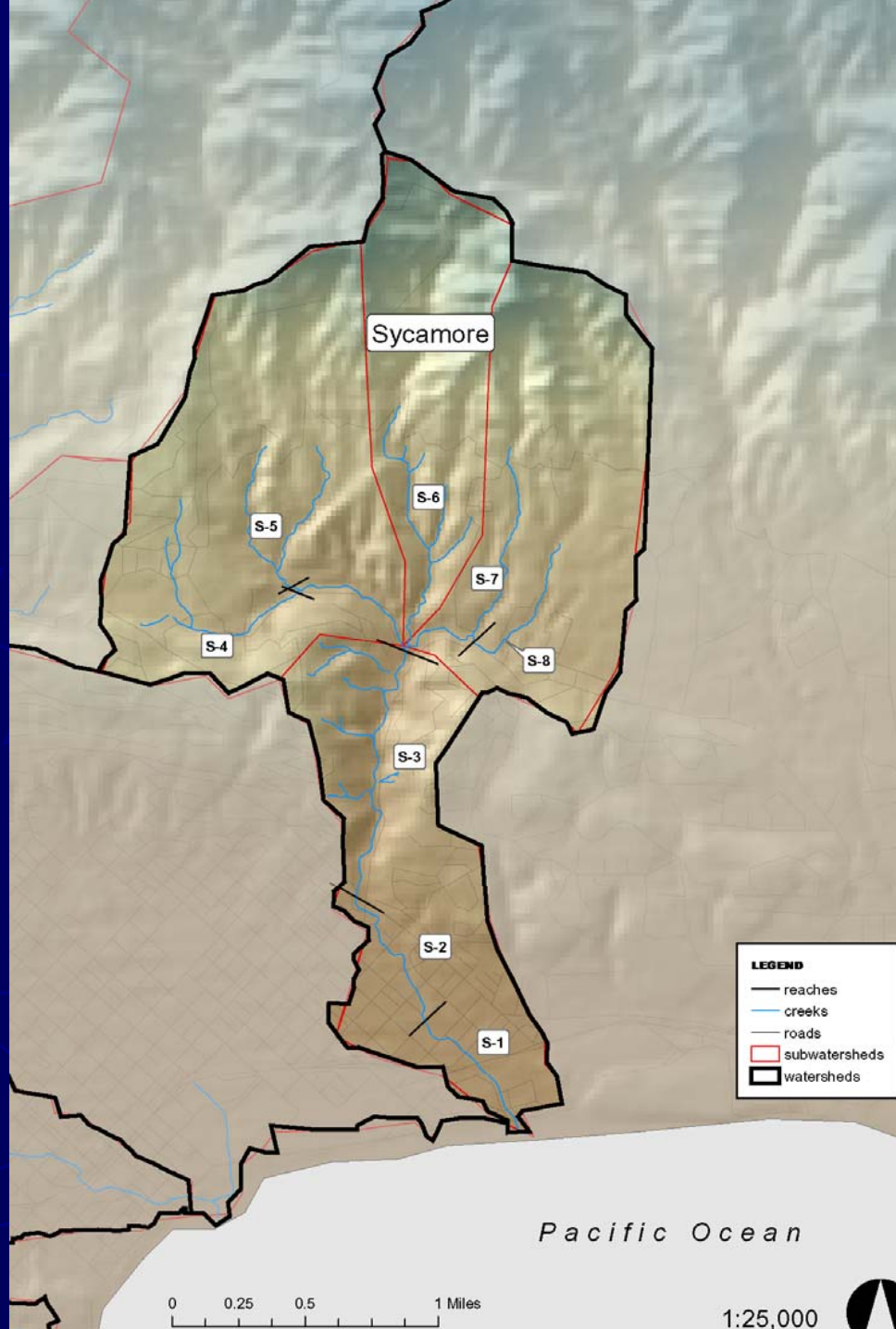
Mission Creek Watershed Conditions



Mission Key Findings

- Sediment aggradation is not a significant problem
- No net scour or deposition occurring in the upper reaches of Lower Mission Creek
- Local bank erosion may be a significant source of sediment deposition in the upper reaches
- High channel velocities and bank shear do not allow widespread use of purely biotechnical bank stabilization methods in the upper reaches
- Combination of hard bank toe support with biotechnical methods on the upper bank slope may be optimal
- Site-specific hydraulic and geomorphic analysis is needed.
- 20 fish barriers identified

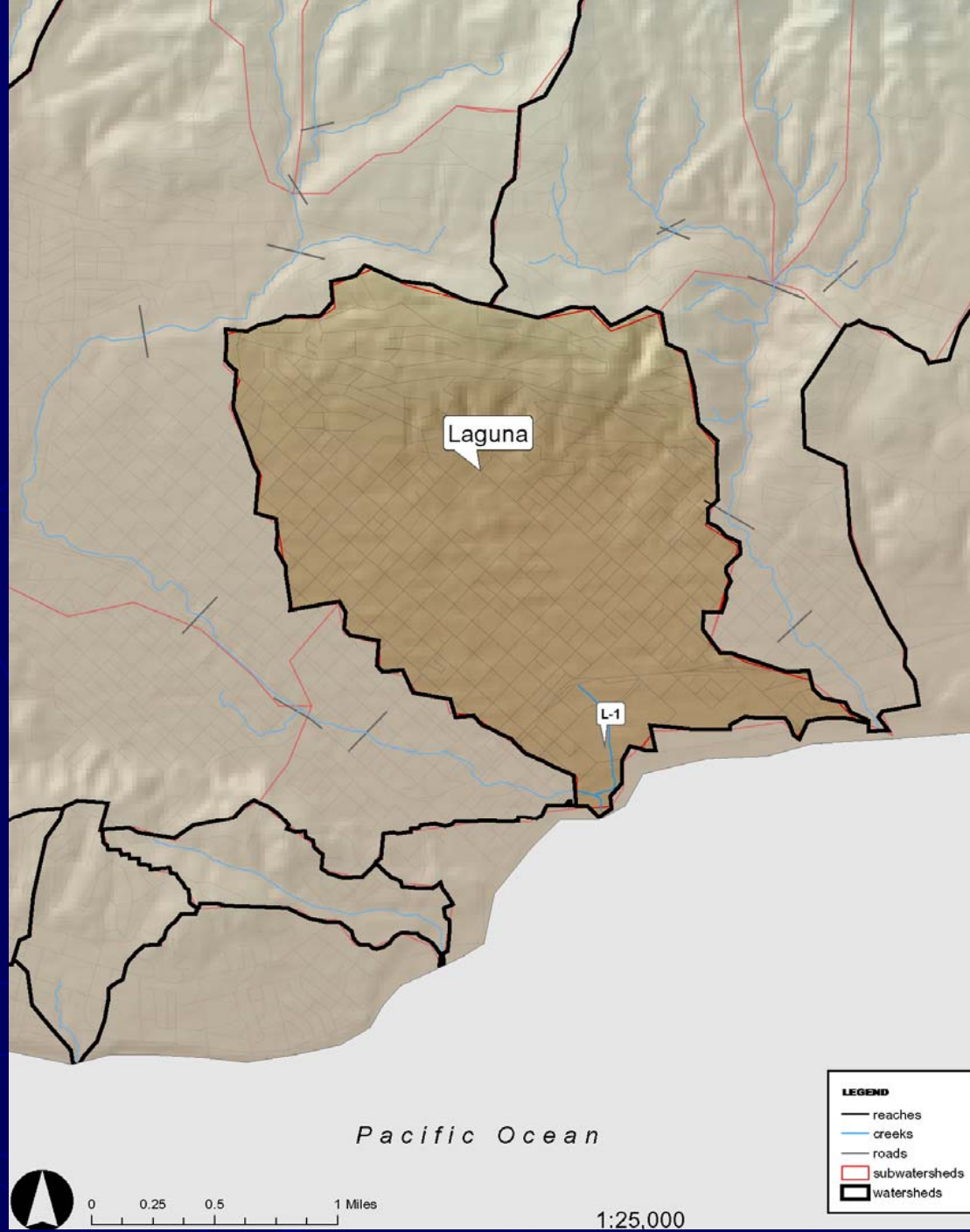
Sycamore Creek Watershed Conditions



Sycamore Key Findings

- Sedimentation is not a problem
- Longitudinal profiles show small reaches of scour/deposition
- Sediment in upper reaches may be due to active and failed banks, and high bed mobility
- Middle reach has most bank erosion sites & would benefit from comprehensive bank stabilization plan
- 100% biotechnical stabilization is not feasible in upper reaches
- Combination of hard bank toe support with biotechnical methods on the upper bank slope may be optimal
- Site-specific hydraulic and geomorphic analysis is needed
- 17 fish barriers
- Need to evaluate conveyance capacity of lower reach for flooding, upstream and downstream of Hwy. 101

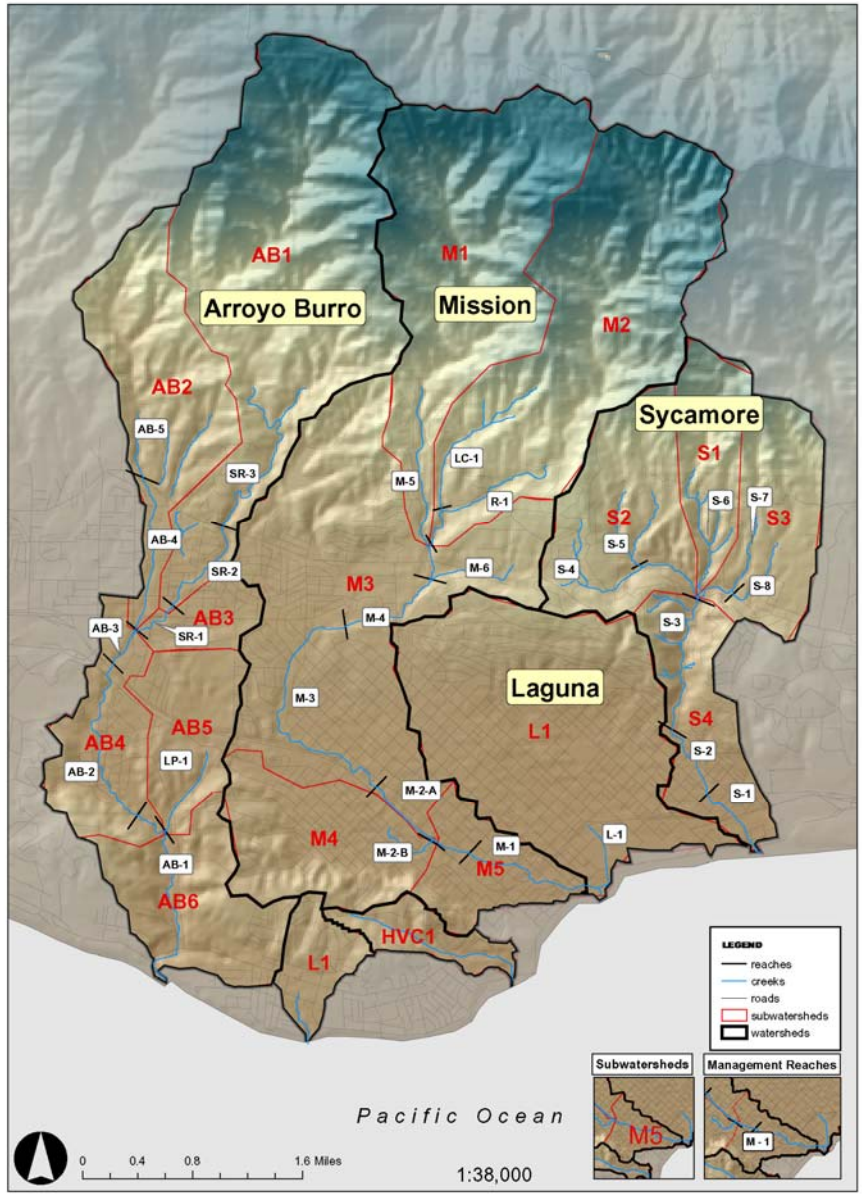
Laguna Creek Watershed Conditions



Laguna Key Findings

- Sedimentation requires dredging every 3-5 years
- Bank erosion is not a significant problem
- Specific site-by-site hydraulic analysis is needed to identify best method to protect slopes
- Channel not adequate to contain 50-year flows
- Tide gate is fish barrier, but there is no upstream habitat, so focus on estuarine species

Watershed Stressors, Preliminary Management Needs, and Recommendations



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Subwatersheds and Management Reaches

Existing Conditions Study of the Arroyo Burro, Mission, Sycamore, & Laguna Watersheds

FIGURE

1-3

Watershed Stressors

- A watershed stressor is a physical, chemical, or biological entity that can induce adverse effects on ecosystems, water quality, or human health.

Land Use Stressors

- Impervious surface areas
- Population density
- Road density
- Dirt roads
- On-site wastewater disposal
- Leaking sewer lines
- Permeable soils/ important recharge areas
- Shallow groundwater occurrence
- Steep slopes/highly erosive soils
- Unstable geologic formations

Watershed Stressors

- Flooding
- Bank erosion
- Revetments
- Channel bed erosion
- Sedimentation
- Water quality
- Aquatic habitat
- Exotic vegetation (or areas invaded by aggressive weedy non-native species)
- Riparian canopy

Riparian Restoration and Enhancement Opportunities

- Preserve and restore mixed riparian canopy to create a continuous corridor
- Remove exotic vegetation
- Use a creek-wide approach to bank stabilization
- Examine creek channel conveyance
- Remove fish barriers with TCFT
- Mission Creek has the highest potential for steelhead recovery, but all creeks can improve fish habitat

Information Gaps

Information Gaps, Existing Regulatory Environment

- Drainage Design Manual: part of TCFT workplan
- Permit streamlining:part of TCFT workplan
- Creek development guidelines, review part of General Plan Update, not Watershed Action Plans

Information Gaps, Water Resources

- Arroyo Burro- update FEMA Hydrologic Model
- Mission Creek – update Corps Hydrologic Model
- Sycamore Creek –develop Hydrologic Model
- Laguna Creek-develop Hydrologic Model based on Corps Lower Mission Creek studies.

Information Gaps, Groundwater

- Complete Shallow Zone Groundwater Assessment

Information Gaps, Geomorphology, Geology and Soils

- Update Stream Geomorphology and Bank Stability Inventory
- Geology and Soils information is adequate
- Develop bank repair design guidelines (w/ TCFT)

Information Gaps, Biological Resources

- Fisheries information from Tri Fish should be integrated into Watershed Action Plans
- Additional Stream Surveys are needed:
  - Upper Arroyo Burro
  - Upper Mission Creek
  - Sycamore Creek bridge crossings
  - Laguna Creek is adequate

Next Steps

- Finalize the Existing Conditions Study and develop Citizen's Guide
- Initiate Watershed Action Plans
  - Vision Statement
  - Goals and Objectives
- Coordinate with other Programs and Agencies
- Develop and Implement a Work Plan
- Complete the Plans and prioritize project implementation

QUESTIONS?